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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21541

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electronics and Instrumentation Engineering

EI 2404/EI 74/EI 1354 A/IC 1002/10133 EI 704 — FIBER OPTICS AND LASER INSTRUMENTS

(Common to Sixth Semester – Instrumentation and Control Engineering and Electrical and Electronics Engineering)

(Regulations 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How numerical aperture is related to total internal reflection in optical fibers?

2. What are permanent and semi permanent Splicer?

3. Differentiate intrinsic and extrinsic fiber optic sensor.

4. Brief about the significance of Polarization maintaining fibers in optical communication.

5. How population inversion is achieved for Laser Generation?

6. What are excimer lasers?

7. Name the common types of lasers used for material processing.

8. What are the merits of Laser Heating?

9. What happens when laser interacts with tissue?

10. List the types of laser used in Brain Tumor Treatment.

PART B — (5 × 16 = 80 marks)

11. (a) Elaborate about the various attenuation losses possible in optical fibers. Also discuss how intramodal and intermodal dispersion can be minimized. (16)

Or

(b) What are the general requirements considered while selecting a light source for fibre optic link? Explain about the construction and working of Photomultiplier Tubes used as optical Source in fibre communication. (4 + 12)

12. (a) With the help of an OTDR display diagram, explain how measurement of attenuation and fiber length is done using Optical Time Domain Reflectometry. (16)

Or

(b) Explain how optical fibers are used as Displacement, position, pressure and level sensors. (16)

13. (a) Discuss about the Resonator Configuration of a laser setup. Also explain about the different modes by which laser is operated for generation of Ultra short pulses. (8 + 8)

Or

(b) With the help of an energy diagram, discuss how four level laser system is advantageous to three level laser system. Also explain the construction and working of a four level laser. (8 + 8)

14. (a) Describe about Laser Doppler Velocimetry for Fluid velocity and acceleration measurement. (16)

Or

(b) Explain in detail the principle of laser welding, melting and trimming of materials. (16)

15. (a) Explain in detail the principles of holographic interferometry and its application in Non Destructive Testing of Materials. (16)

Or

(b) Write technical notes on :

(i) Laser instruments for brain surgery

(ii) Laser instruments for gynecology and oncology. (8 + 8)

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